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SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE
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Item 7 of the provisional agenda

DEVELOPMENT AND TRANSFER OF TECHNOLOGIES

Initial report on an inventory and assessment of technologies to mitigate and adapt to climate change

Addendum

ADDITIONS TO THE TECHNOLOGY INVENTORY DATABASE

Note by the secretariat

I. MANDATE

1. The Subsidiary Body for Scientific and Technological Advice (SBSTA), at its second session, considered the preparation of a technology inventory and assessment, as mentioned in decision 13/CP.1, and based its discussions on the initial report of the secretariat on this subject (FCCC/SBSTA/1996/4).

2. In its conclusions, the SBSTA:

(a) "Recognized that the identification of and information on technologies and know-how that could assist the Parties in the preparation of national plans would be particularly useful, and urged all Parties who have not already done so to provide the secretariat with information and databases on environmentally sound and economically viable technologies and know-how conducive to mitigating and adapting to climate change, including information from the private sector when possible, and to continue to do so on a routine basis in the future";

(b) "Requested the secretariat to continue its activities, in cooperation with other relevant organizations, related to the preparation of an inventory and assessment of environmentally sound and economically viable technologies and know-how conducive to mitigating and adapting to climate change, to take into consideration the activities of other United Nations agencies and intergovernmental organizations, and other relevant programmes and to use all means possible to communicate the information to Parties";

(c) "Further requested the secretariat to inform the SBSTA periodically about new information on technologies and know-how in the research and development stage that may be conducive to mitigating and adapting to climate change and activities aimed at increasing the diffusion and commercialization of such technologies and know-how" (FCCC/SBSTA/1996/8, section VII).

II. SCOPE OF THE NOTE

3. According to this mandate the secretariat continued to update the database on information sources on technologies by classifying and entering the incoming submissions by Parties, specialized agencies and other bodies of the United Nations system, intergovernmental organizations, and other institutions. This document contains new information sources and is a supplement to the document FCCC/SBSTA/1996/4/Add.1.

III. HIGHLIGHTS OF NEW SUBMISSIONS

4. Since the SBSTA "recognized that the identification of and information on technologies and know-how that could assist the Parties in the preparation of national plans would be particularly useful" (FCCC/SBSTA/1996/8, para. 82), the secretariat draws special attention to the following entries, selected only from the new submissions, which can be considered helpful in this manner:

Computer software

5. The secretariat has received several types of computer software. One type, item (a) below, is primarily a database on technologies containing technical, environmental, and financial information. The second type, items (b), (c) and (d), are simple models that enable the user to compare technologies or evaluate options according to different criteria, for example, minimal costs. (Parties should note that additional software is identified in the IPCC Second Assessment Report Working Group II, chapter 27 "Methods for assessment of mitigation options"):

(a) The *IIASA CO_2 Technology Data Bank* was developed by the International Institute for Applied Systems Analysis (IIASA) as a software system for collecting data on technologies related to CO_2 emissions. Technical, economic and environmental data, labour and material information on nearly 1000 technologies are stored in the data bank.

Technologies can be linked to a chain of primary energy, secondary electricity, final electricity and energy service, and costs and emissions of different chains can be calculated and assessed;

(b) The *Greenhouse Gas Assessment Methodology (GGAM)* was originally written for the World Bank to use in the preparation of project proposals. It was developed jointly by the Center for Global Change at the University of Maryland, United States of America and the Stockholm Environment Institute, Sweden. It offers a user-friendly tool for graphical comparison of alternative projects. Project information is entered through an interactive questionnaire that is linked to an extensive database of reference technologies. It calculates the costs, environmental impacts, and cost-effectiveness of the alternative projects. Although the reference technology database is built on published studies of the environmental impacts of energy technologies that have been carried out principally in Annex I countries, GGAM has an easy-to-use provision for updating the database with information about the specific conditions, fuels, or types of technologies being considered for use in non-Annex I countries;

(c) The *Instruments for Reduction Strategies of Greenhouse Gases (IKARUS)* was developed by the Programme Group Technology Assessment (TFF) in the Forschungszentrum Jülich, Germany with support from the Federal Government of Germany in order to simulate and evaluate alternative actions to reduce greenhouse gas emissions with a time horizon up to the year 2020 for Germany. The software contains a technology database and an optimization model which simulates the energy flow of Germany in approximately 2000 aggregated energy technologies. It also includes simulated models of the electricity, industry, and transport sectors which can be used for detailed case studies and which can provide emission and cost information;

(d) The *Information System on Conservation and Application of Resources Using a Sector Approach (ICARUS)* was developed for the Netherlands by the Department of Science, Technology and Society at the University of Utrecht. It may be used to evaluate the effects of financial policy instruments, such as carbon taxes or investment subsidies. For different options the software calculates the fuel and electricity savings, the avoided CO_2 emissions, yearly and total costs and the cost-effectiveness of CO_2 emission reduction and energy conservation for 2000 and 2015 in the Netherlands.

Reports

6. The secretariat also received a number of reports of which three are highlighted in this context:

(a) *"Comparing energy technologies"* by the International Energy Agency (IEA) and the Organisation for Economic Co-operation and Development (OECD) is a follow-up to the "IEA/OECD Scoping Study: Energy and Environmental Technologies to Respond to Global Climate Change Concerns". This publication examines currently available methodologies for comparison of energy technologies; it provides suggestions for their

development, for consideration by both research and development practitioners and policy makers. It also presents actual examples of how governments go about making energy research and development choices;

(b) *"The case for solar investments"*, a paper by the World Bank, summarizes the technical and economic prospects for solar energy technologies and outlines a two-part programme that would help to commercialize solar energy use in developing countries. The first part of the programme describes a "pipeline" of investments drawing on financial resources that are already available for well prepared investments. The second part concerns the need to expand public research and development at the national and international level in support of private initiative;

(c) *"A guide for methane mitigation projects, gas-to-energy at landfills and open Dumps"* by the United States Environmental Protection Agency provides guidelines for developing programmes to reduce methane emissions from landfills and large open dumps by recovering and utilizing landfill gas. It provides a step-by-step method for identifying and evaluating landfills and open dumps that are promising candidates for emissions reductions through gas recovery and utilization.

Title	Organization	Information	Technologies	Users	Access	Remarks
Contributing Party						
Commission of the European Communities						
New Clean and Low Waste Products, Processing and Service and Ways to promote the Diffusion of such Practices to Industry November 1995	Commission of the European Communities. Office for Official Publications 2 rue Merier 2985 Luxembourg Luxembourg Study by Ecotec Research and Consulting Ltd.	Summary report / book with Status of R & D Case studies	Environmentally sound technologies	Policy and decision makers Global	Unrestricted	The publication presents the results of research carried out to assess the potential impacts, on industrial competitiveness and employment, of changes in cleaner technology and consumer behaviour. The results are based upon a series of case studies of cleaner technology and of changes in consumer behaviour.
Germany						
Basic Electrification for Rural Households, Experience with the Dissemination of Small-Scale Photovoltaic Systems September 1995	GTZ (German Agency for Technical Cooperation) Postfach 5180 D-65726 Eschborn Germany II/0995/0.6	Summary report / book with Status of R & D Case studies	Renewable - photovoltaic	Policy and decision makers Global	Unrestricted	This study documents the essential technical and economic findings and experience gained in the design, introduction and dissemination of photovoltaic technology.
IKARUS, Instruments for Reduction Strategies of Greenhouse Gases	Federal Ministry for Education, Science, Research and Technology Bonn Germany Forschungszentrum Juelich, Programmgruppe TFF, D-52425 Juelich	Information system - for PC with Emissions/costs calculations	Fossil fuels Renewables Nuclear Transportation Buildings / habitat Industry	Policy and decision makers Engineers National Germany	Unrestricted	A model that can be used on large PCs to evaluate technology options in Germany to reduce greenhouse gases. Options taken from a technology database can be linked, and the environmental and economic impacts of those options may be calculated.
Monaco						
Technology in Monaco	Le Ministre Plénipotentiaire Villa GIRASOL 16, Bd. de Suisse MC-98000 Monaco	Article / leaflet / booklet with Product descriptions	Fossil fuel - gas Buildings / habitat	Engineers National Monaco	Unrestricted	Monaco reported on local companies which manufacture polyethylene equipment for natural gas distribution, measurement equipment for gas samples and gas reduction technologies for refrigerators and air conditioners.
Netherlands						
Environmental Technology, Directory of Companies 1995	Association of Suppliers of Environmental Equipment and Techniques P.O. Box 190 NL-2700 AD Zoetermeer The Netherlands	Summary report / book with Company profiles and capabilities	Renewable - biomass Waste management Industry - chemicals Industry - pollution control Water supply / sanitation	Businesses National Netherlands	Unrestricted	The directory contains a list of companies in the Netherlands dealing with water treatment, air, soil, non-chemical and chemical waste, manure processing, sounds and vibrations as well as instrumentation and integral environmental technology.

Title	Organization	Information	Technologies	Users	Access	Remarks
ICARUS-3, Information System on Conservation and Application of Resources Using a Sector Approach.	University of Utrecht Department of Science, Technology & Society Padualaan 14 NL-3584 CH Utrecht Netherlands	Information system - for PC with Emissions/costs calculations	Fossil fuel - gas Fossil fuel - oil Fossil fuel - coal Renewable - solar thermal Renewable - photovoltaic Renewable - wind Renewable - hydropower Renewable - biomass	Policy and decision makers National Netherlands	Unrestricted	This software package is capable of calculating the emissions and costs and benefits of different energy conservation measures, cogeneration and renewable energy sources in the Netherlands. Technologies may be chosen from a database.
United States of America						
A Guide for Methane Mitigation Projects. Gas-to-Energy at Landfills and Open Dumps Draft January 1996	United States Environmental Protection Agency 401 M. Street S.W. Mail Code PM-2122 Washington DC 20460 United States of America Air and Radiation (6202 J)	Summary report / book with Status of R & D Policies and measures Other information sources	Waste management	Policy and decision makers Global	Unrestricted	This report provides guidelines for developing programmes for reducing methane emissions from landfills and large open dumps by recovering and utilizing landfill gas. It is directed toward programme managers responsible for developing GHG mitigation programmes in developing countries and countries with economies in transition. It provides a step-by-step method for identifying and evaluating landfills and large open dumps that are promising candidates for emissions reduction through gas recovery and utilization. It discusses how national policies affect the viability of landfill gas recovery projects and identifies what steps might be taken to encourage the development of this resource.
Clean Coal Technology Demonstration Program July 1995	Department of Energy 1000 Independence Ave. SW Washington DC 20585 United States of America DOE/FE-0339	Summary report / book with Demonstration objects	Fossil fuel - coal	Policy and decision makers Businesses National United States of America	Unrestricted	This report contains almost 100 technical fact sheets on demonstration projects of advanced power generation, environmental control devices, coal processing for clean fuels and industrial applications in the United States of America.
Specialized agencies and other bodies of the United Nations system						
Economic and Social Commission for Asia and the Pacific						
Energy Efficiency, Guidebook for Energy and Service Companies in Asia 1995	Economic and Social Commission for Asia and the Pacific United Nations Building Rajadamnern Avenue Bangkok 10200 Thailand ST/ESCAP/1514	Summary report / book with Methods and practices	Industry - other Energy technologies	Businesses Regional Asia and Pacific	Unrestricted	This guidebook has been prepared to provide information for engineering companies and individuals who are interested in energy efficiency consulting. It describes and analyses potential business opportunities for energy service companies in Asia.

Title	Organization	Information	Technologies	Users	Access	Remarks
Energy Efficiency, Directory of Energy Consultants, Service Companies, Manufacturers and Distributors of Energy Equipment and Appliances in Asia 1995	Economic and Social Commission for Asia and the Pacific United Nations Building Rajadamnern Avenue Bangkok 10200 Thailand ST/ESCAP/1490	Summary report / book with Company profiles and capabilities	Energy technologies	Businesses Policy and decision makers Regional Asia and Pacific	Unrestricted	A roster of more than 400 regional experts, institutions and companies engaged in conservation and efficient utilization of energy was prepared. It is a supplement to the Energy Efficiency Guidebook.
Economic and Social Council						
Energy and Sustainable Development, Renewable Sources of Energy with Special Emphasis on Biomass: Progress and Policies February 1996	Economic and Social Council United Nations Headquarters New York NY 10017 United States of America Committee on New and Renewable Sources of Energy and on Energy Development E/C.13/1996/CRP.1	Article / leaflet / booklet with Status of R & D	Renewable - biomass	Policy and decision makers Global	Unrestricted	The report reviews the resource potential, environmental and social impacts and technology trends of bioenergy as well as policy requirements and implications.
Economic Commission for Europe						
Solar Power Systems 1993	Economic Commission for Europe Palais des Nations CH-1211 Geneva 10 Switzerland ISBN 92/1/100668/6	Conference / workshop report with Status of R & D	Renewable - solar thermal Renewable - photovoltaic	Policy and decision makers Engineers Businesses Global	Unrestricted	The technological status, economics, applications and competitiveness of small and large size solar electricity systems are reviewed in this publication. Steps needed to make solar energy a viable and significant source of electricity in the 21st century are discussed.
Food and Agriculture Organization of the United Nations						
Bioenergy for development 1994	Food and Agriculture Organization of the United Nations Via delle Terme di Caracalla I-00100 Rome Italy Environment and Energy Paper 13	Summary report / book with Status of R & D Policies and measures	Renewable - biomass Waste management	Policy and decision makers Global	Unrestricted	This study examines the present role of biomass in the world's energy supply and calculates the potential for future biomass energy in the next century. It contains examples of biomass production and conversion to both modern and traditional fuels. Environmental effects of biomass use are examined on the global scale, considering health and sustainable production practices. Policy issues are discussed at the local and international level.

Title	Organization	Information	Technologies	Users	Access	Remarks
International Panel of Experts on Desertification						
Assessment of Solar and Wind Energy Utilization in Africa December 1994	Secretariat of the Convention to Combat Desertification Palais des Nations CH-1211 Geneva 10 Switzerland	Summary report / book with Status of R & D	Renewable - solar thermal Renewable - photovoltaic Renewable - wind	Policy and decision makers Regional Africa	Unrestricted	The use of solar and wind energy in Maghreb and Egypt, West Africa, East and Southern Africa is assessed and action proposals for improvement of the basic conditions for their development and application are made.
United Nations Educational, Scientific and Cultural Organization						
Manual on Sea-Level Measurement and Interpretation 1994	Intergovernmental Oceanographic Commission UNESCO 1, rue Miollis F-75732 Paris Cedex 15 France Manuals and Guides 14	Summary report / book with Methods and practices	Adaptation	Engineers Scientists Global	Unrestricted	The manual reports on sea level measurement and interpretation technologies.
World Meteorological Organization						
Hydrological Operational Multipurpose System (HOMS)	World Meteorological Organization Avenue Giuseppe-Motta 41 Case Postale 2300 CH-1211 Geneva 2 Switzerland http://www.wmo.ch/web/homs/homsp1.html	Information system - on-line Web site with Status of R & D	Adaptation Water supply / sanitation	Engineers Global	Unrestricted	This web site contains information on ready to use and hydrology technology in the form of descriptions of instruments, technical manuals or computer programs.
Intergovernmental organizations						
International Energy Agency						
Comparing Energy Technologies 1996	International Energy Agency 2, rue André-Pascal F-75775 Paris Cedex 16 France ISBN 92-64-14 660-1	Summary report / book with Status of R & D Policies and measures Case studies	Energy technologies	Policy and decision makers Scientists Global	Unrestricted	This report is a follow up of the IEA/OECD Scoping study: Energy and Environmental Technologies to Respond to Global Climate Change Concerns. This second issue is of a more general nature. It examines currently available methodologies for comparison of energy technologies and it provides suggestions for their development, for consideration by both R&D practitioners and R&D policy makers.

Title	Organization	Information	Technologies	Users	Access	Remarks
Organisation for Economic Co-operation and Development						
Biotechnology for a Clean Environment. Prevention, Detection, Remediation 1994	Organisation for Economic Co-operation and Development 2, rue André-Pascal F-75775 Paris Cedex 16 France ISBN 92-64-14257-6	Summary report / book with Status of R & D Policies and measures	**Biotechnology**	**Policy and decision makers** **Global**	Unrestricted	This report is divided into two parts. Part I is a review of the benefits biotechnology offers for the prevention, detection and remediation of air, water, and soil pollution. Part II describes industry strategies and presents an economic perspective on environmental biotechnology. An annex gives information on Government R&D initiatives.
World Bank						
The Case for Solar Energy Investments February 1995	World Bank 1818 H Street, NW Washington DC 20433 United States of America Technical Paper Number 279	Summary report / book with Status of R & D Policies and measures Cost-effectiveness study	**Renewable - solar thermal** **Renewable - photovoltaic** **Renewable - wind** **Renewable - hydropower** **Renewable - biomass**	**Policy and decision makers** **Global**	Unrestricted	After summarizing the technical and economic prospects for solar energy technologies, the paper outlines a two-part programme that would help to commercialize solar energy use in developing countries.
Other institutions and organizations						
Business Council for a Sustainable Energy Future						
Clean Energy for a Sustainable Future: Business Council Case-Studies of Clean Energy Technology Deployment September 1994	Business Council for a Sustainable Energy Future 1725 K Street, N.W. Suite 509 Washington DC 20006-1401 United States of America	Summary report / book with Case studies Company profiles and capabilities	**Energy technologies**	**Businesses** **Policy and decision makers** **Global**	Unrestricted	This report contains 30 case studies of clean energy projects that support economic growth while protecting the environment.
Center for Global Change						
Greenhouse Gas Assessment Methodology (GGAM)	Center for Global Change Univ. of Maryland, Executive Bldg (Suite 401), 7100 Baltimore Ave College Park MD 20740 United States of America Dr. Irving Mintzer email: imintzer@igc.apc.org	Information system - for PC with Emissions/costs calculations	**Energy technologies**	**Policy and decision makers** **Global**	Unrestricted	This interactive, user-friendly software is designed to help project managers, investors, and other analysts compare the environmental impacts of conventional investment projects with the impacts of projects designed to reduce greenhouse gas emissions or increase sequestration. It presents the costs, environmental impacts, and cost-effectiveness of the environmentally friendly project and compares them to the conventional alternative.

Title	Organization	Information	Technologies	Users	Access	Remarks
Edison Electric Institute						
Climate Challenge Options Workbook October 1994	Edison Electric Institute 701 Pennsylvania Avenue, N.W. Washington DC 20004-2696 United States of America	Summary report / book with Status of R & D	Fossil fuels Renewables Nuclear Energy transfer Energy storage Transportation Buildings / habitat Direct CO_2 removal	Policy and decision makers National United States of America	Unrestricted	This workbook, a collaborative effort of the United States Department of Energy and the Edison Electric Institute, is intended to provide guidance to electric utilities that desire to undertake voluntary and cost-effective actions to reduce, avoid, or sequester greenhouse gases. It includes descriptions of many of the barriers which may deter the process, along with suggestions for overcoming those barriers.
Globe Foundation Canada						
GLOBE Resource Centre on Business and the Environment	Globe Foundation of Canada World Trade Center 504-999 Canada Place Vancouver BC Canada V6C 3E1 http://www.globe.ca	Web site with Other information sources Product descriptions Policies and measures	Transportation - air/water Transportation - train Transportation - automobile Waste management Industry - other Water supply / sanitation Energy technologies	Policy and decision makers Businesses Engineers General public Global	Unrestricted	This web site focuses on the needs of environmental business professionals. It contains an extensive number of links, grouped by topics such as "environmental technology and services" as well as "policy and regulation", "corporate environment strategy" and "NGOs"
Industry Canada						
Canadian Environmental Solutions	Industry Canada 235 Queen Street Ottawa, Ontario Canada K1A 0H5 mail: bradet.lucien@ic.gc.ca	Information system - for PC with Company profiles and capabilities	Environmentally sound technologies.	Businesses General public Policy and decision makers National Canada	Unrestricted CD-ROM $69.99 Diskette $39.99	This multimedia tool contains 1500 environmental problems related to water, air, soil, research and development and energy, 2000 solutions with their descriptors, and profiles of close to 700 Canadian companies that can provide those solutions. It is available on CD-ROM, diskette and Internet.
International Institute for Applied Systems Analysis						
IIASA CO_2 Technology Data Bank	International Institute for Applied Systems Analysis Schlossplatz 1 P.O. Box 40 A-2361 Laxenburg Austria	Information system - for PC with Status of R & D Emissions/costs calculations	Fossil fuel - gas Fossil fuel - oil Fossil fuel - coal Renewable - solar thermal Renewable - photovoltaic Renewable - wind Renewable - hydropower Renewable - biomass Nuclear Direct CO_2 removal	Policy and decision makers Engineers Global	Unrestricted	This software system contains a data bank on technologies related to the CO_2 emissions. It contains technical, economic and environmental data, labour and material requirements of many technologies, which can be linked to energy chains and compared with other alternatives.

Title	Organization	Information	Technologies	Users	Access	Remarks
International Project for Sustainable Energy Paths						
Low-Carbon Fossil Power Generation, the Cost and Potential of Cogeneration and High-Efficiency Central Stations 1994	International Project for Sustainable Energy Paths 7627 Leviston Ave. El Cerrito CA 94530 United States of America Energy Policy in the Greenhouse, Volume II, Part 3c	Summary report / book with Status of R & D Policies and measures	**Fossil fuel - gas** **Fossil fuel - oil** **Fossil fuel - coal**	Policy and decision makers Global	**Unrestricted**	In this report low-carbon fossil power generation options are compared with other fossil and non-fossil options, their economic resource potential in Western Europe over the next three decades is reviewed and the policies needed to fully mobilize them are identified.
Kluwer Academic Publishers						
African Greenhouse Gas Emission Inventories and Mitigation Options: Forestry, Land-Use Change, and Agriculture 1995	Kluwer Academic Publishers Spuiboulevard 50 P.O. Box 17 NL-3300 AA Dordrecht Netherlands ISBN 0-7923-3942-8	Conference / workshop report with Methods and practices	**Waste management** **Agricultural and forestry practices**	Policy and decision makers Regional Africa	**Unrestricted**	This publication presents the major conclusions of a workshop held at Johannesburg, South Africa in June 1995. It discusses national emissions inventory assessments, possible mitigation options and methods to evaluate their potential viability.